education
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA


# PREPARATORY EXAMINATION

## GRADE 12

## LIFE SCIENCES P1

## SEPTEMBER 2022


**MARKS: 150**

**TIME: 2½ HOURS**

**This question paper consists of 20 pages.**

## INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write all the answers in the ANSWER BOOK.
3. Start the answers to EACH question at the top of a NEW page.
4. Number the answers correctly to the numbering system used in the question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.

## SECTION A

## QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 - D.

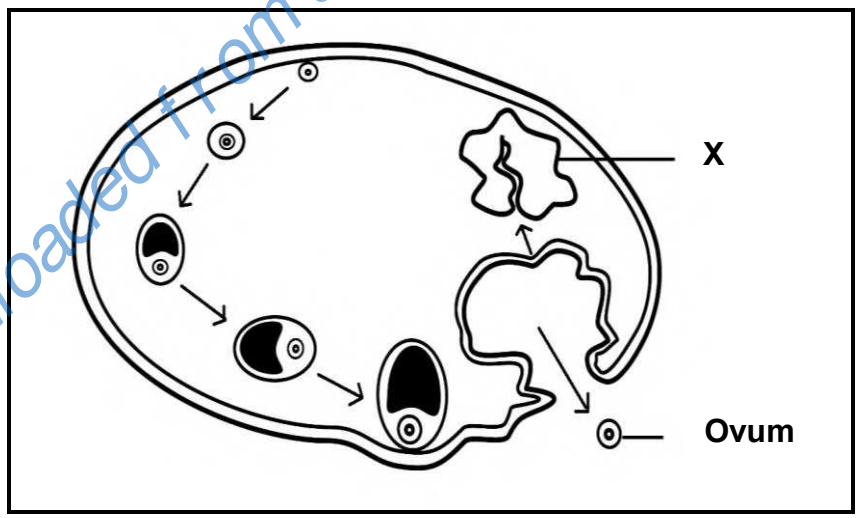
1.1.1 Which ONE of the following structures in an amniotic egg protects the developing embryo from physical injury?

A Allantois
B Shell
C Chorion
D Yolk sac

1.1.2 One of the functions of the hormone progesterone is to …

A bring about the formation of the corpus luteum.
B promote the development of secondary characteristics in both males and females
C promote the maturation of ovarian follicles.
D prepare the uterine wall for implantation of the embryo.

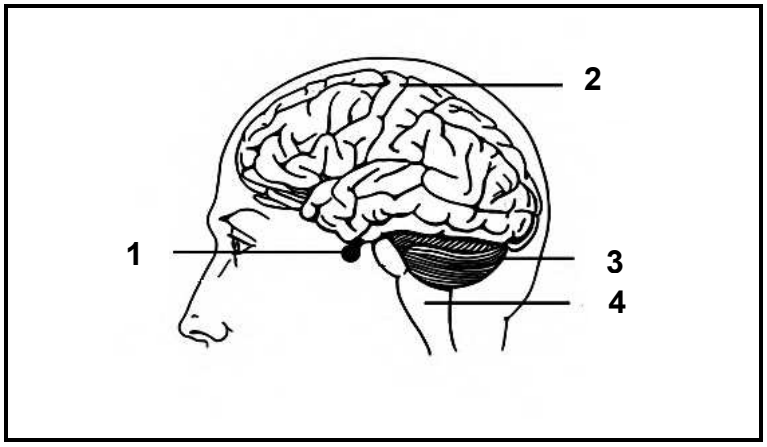
1.1.3 The diagram below represents a part of the female reproductive cycle.




The main function of part **X** is to secrete …

A LH.
B FSH.
C progesterone.
D oestrogen.

1.1.4 The diagram below represents the human brain and part of the spinal cord.




A patient experiences slight visual and speech disturbance after a serious head injury. Which section of the brain has possibly been damaged?

A 1
B 2
C 3
D 4

1.1.5 Which ONE of the following is the function of gibberellins?

A Bring about dormancy of seeds by slowing down germination, and dormancy of apical buds
B Bring about tropism in plants
C Promote development of flowers in plants
D Promote the growth of lateral buds

1.1.6 The picture below shows the world's shortest woman.

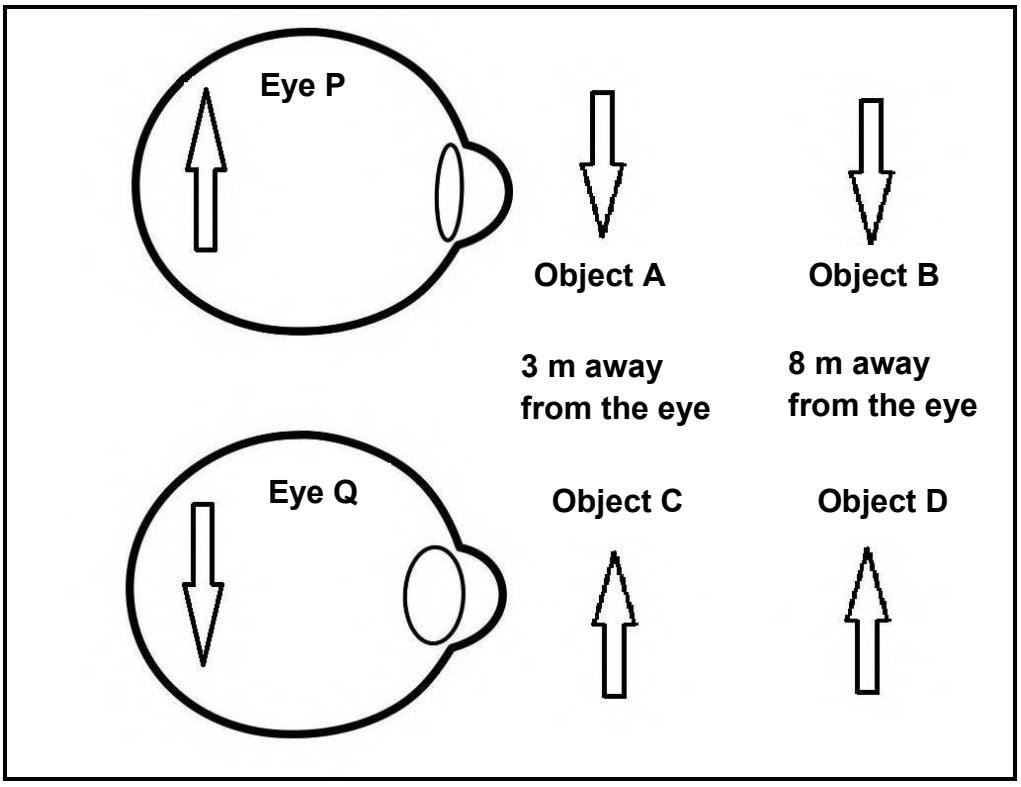

*[Jyoti Amge, The world's shortest woman. (62,8 cm) Lauche Guinnes World Records 2014.www.huffingtonpost.com/2013/09/11jyoti-amge_n_3907742-html]*

Which ONE of the following endocrine glands plays a role in the physiological condition shown in the picture?

A Ovary
B Adrenal gland
C Pancreas
D Pituitary gland

1.1.7 The diagram below shows two eyes (**P** and **Q**) focused on objects represented by arrows at different distances from the eye.

Objects **A** and **C** are 3 metres away from the eye and objects **B** and **D** are 8 metres away from the eye.

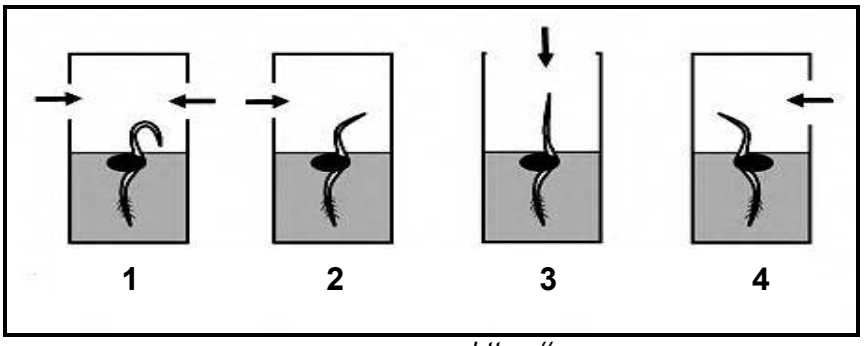



Which ONE of the following represents the objects focussed on by **P and Q**?

| | Eye **P** | Eye **Q** |
|---|---|---|
| A | Object **A** | Object **C** |
| B | Object **A** | Object **D** |
| C | Object **B** | Object **D** |
| D | Object **B** | Object **C** |

1.1.8 The diagram below shows the direction of the plumule growth in various seedlings 1, 2, 3 and 4 placed in cardboard boxes.

The arrows indicate the direction of light.




https://www.saexampapers.co.za

Which ONE of the above seedlings shows the correct response to light?

A 3
B 4
C 2
D 1

1.1.9 Which ONE of the following represents the correct functions of the cerebrum and the medulla oblongata?

| | CEREBRUM | MEDULLA OBLONGATA |
|---|---|---|
| A | Controls and co-ordinates voluntary actions | Co-ordinates voluntary actions |
| B | Controls involuntary actions | Co-ordinates voluntary actions |
| C | Controls involuntary actions | Controls voluntary actions |
| D | Controls voluntary actions | Controls involuntary actions |

1.1.10 A high concentration of adrenalin in the blood leads to an increase in blood glucose levels, because …

A there is a decrease in metabolic rate.
B glycogen in the liver and muscles is converted to glucose.
C there is an increase in the digestion of carbohydrates.
D proteins are broken down to release more glucose.

(10 x 2) **(20)**

1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.2.1 to 1.2.10) in the ANSWER BOOK.

1.2.1 The hormone secretion from the islets of Langerhans that lowers the glucose level of blood

1.2.2 Glands located on top of the kidney consisting of a cortex and medulla

1.2.3 The homeostatic control of water balance in the blood

1.2.4 The fluid that supports the cornea in the front chamber of the eye

1.2.5 A plant growth substance that causes leaves to fall off trees in autumn


1.2.6 The system in the body that regulates processes by secreting hormones directly into the blood

1.2.7 The gland responsible for the production of ADH

1.2.8 The proteins secreted into the blood that act as chemical messengers

1.2.9 The hormone secreted by the adrenal glands that regulates the sodium concentration of the blood

1.2.10 The part of the human ear that directs sound waves into the auditory canal

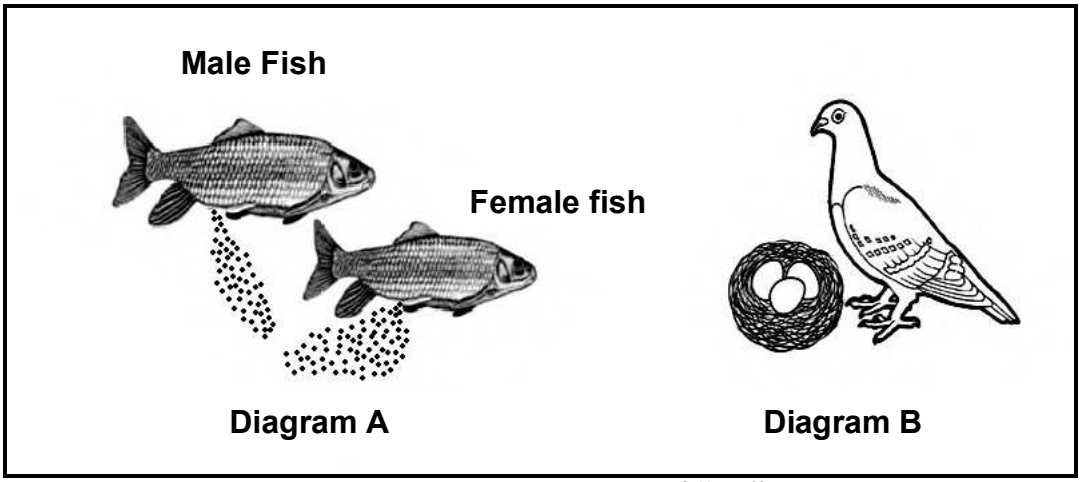
(10 x 1) **(10)**

1.3 Indicate whether each of the statements in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.4) in the ANSWER BOOK.

| | COLUMN I | COLUMN II |
|---|---|---|
| 1.3.1 | The layer in the eye that contains receptors sensitive to light | A: Choroid<br>B: Retina |
| 1.3.2 | Converts sound stimuli to nerve impulses | A: Oval window<br>B: Semi-circular canals |
| 1.3.3 | The hormone that is in excess in a person that grows abnormally tall | A: Growth hormone<br>B: ADH |
| 1.3.4 | Plant hormone that helps plant seeds to survive unfavourable conditions | A: Auxins<br>B: Abscisic acid |


(4 x 2) **(8)**

1.4 The diagrams below represent organisms with different reproductive strategies.




*https://www.saexampapers.co.za*

1.4.1 Identify the type of fertilisation displayed in:

(a) Diagram **A** (1)

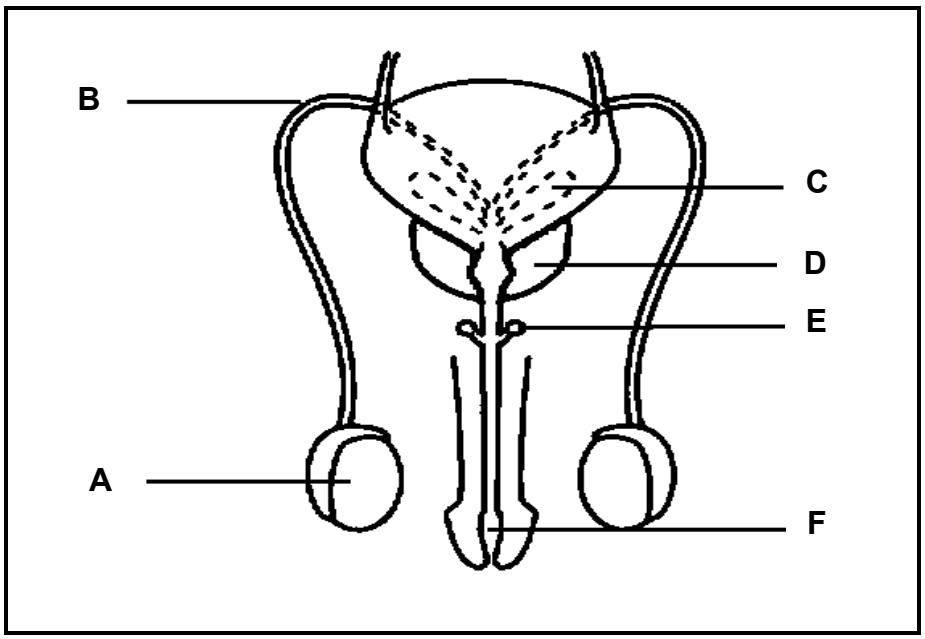
( b) Diagram **B** (1)

1.4.2 Provide the name of the reproductive strategy represented in the diagrams above. (1)

1.4.3 Name the type of egg produced by the organism represented in Diagram **B**. (1)

1.4.4 Give the names of TWO extra-embryonic membranes that function in gaseous exchange in the egg mentioned in QUESTION 1.4.3 (2)
**(6)**

1.5 The diagram below represents the human male reproductive system




*Adapted from DBE Sep/KZN/ 2015 LFSC P1*

1.5.1 Identify structures:

(a) **C** (1)

(b) **E** (1)

(c) **F** (1)

1.5.2 Give the LETTER of the part that is associated with each of the following statements:

(a) When cut, results in the production of semen that does not contain sperm cells. (1)

(b) The secretion of an alkaline fluid which neutralises the acidity of the vagina. (1)

(c) The production of testosterone. (1)

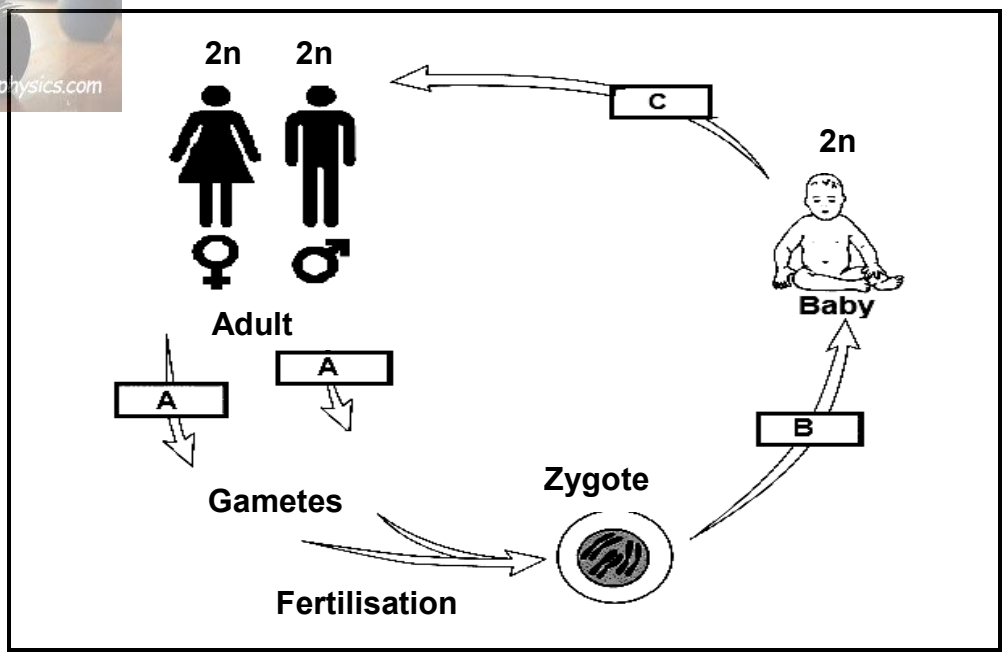
**(6)**

**TOTAL SECTION A: 50**

## SECTION B

## QUESTION 2

2.1 The diagram below represents the human life cycle.




http://zivichristian.blogspot.com/2012/11/cycles-of-life.html

2.1.1 Name the type of cell division responsible for the process taking place at:

(a) **A** (1)

(b) **B** (1)

2.1.2 How many pairs of chromosomes are present in the zygote? (1)

2.1.3 Name the hormone responsible for the secondary sexual changes during process **C** in females. (1)

2.1.4 Name and describe the process **A** as it occurs in males. (4)

2.1.5 Name the developmental structures, between zygote formation and birth that:

(a) Comprise a ball of cells (1)

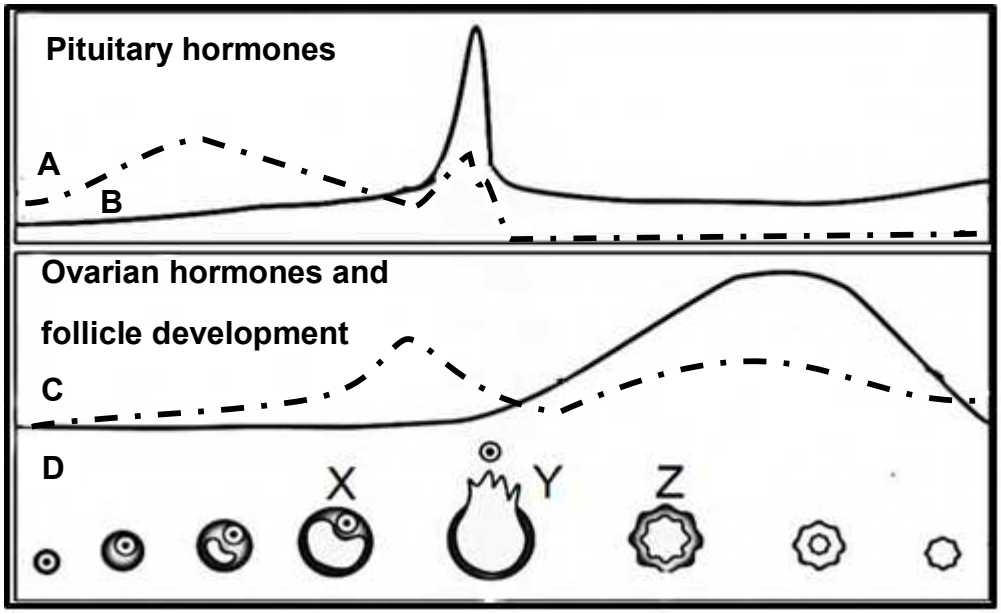
(b) Is a hollow ball of cells (1)

(c) Is formed after implantation (1)

(d) Is formed after organ formation (1)

**(12)**

2.2 The chart below represents the hormonal control of the ovarian cycle in a female.




2.2.1 Identify:

(a) Structure **X** (1)

(b) Process **Y** (1)

2.2.2 Explain the effect on pregnancy if structure **Z** disintegrates directly after implantation. (3)

2.2.3 Describe the development of structure **X**. (4)

2.2.4 Describe ovulation and the resulting formation of structure **Z**. (4)
**(13)**

2.3 Read the extract below.

> Placenta encapsulation is a process where the human placenta is processed and transformed into pills that can be taken by the new mother after birth. This is a new trend among various celebrities who claims that it speeds up recovery after giving birth and also enhances milk production in the female.

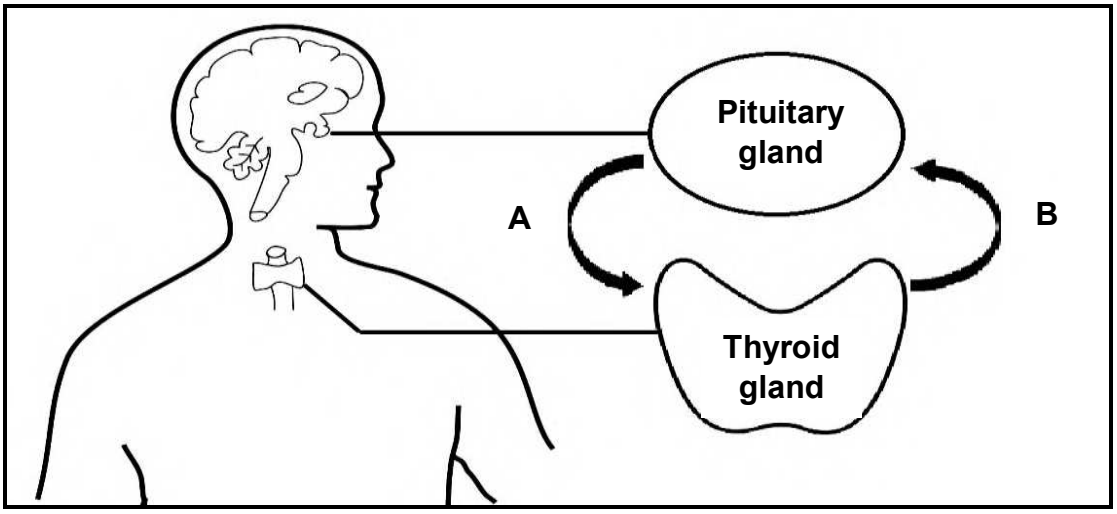
*https://health.clevelandclinic.org/placenta-pills-why-some-new-moms-take-them-and-what-doctors-say-about-the-risks/*

2.3.1 Give ONE advantage of placenta encapsulation. (1)

2.3.2 Provide THREE functions of the human placenta. (3)

2.3.3 Refer to the role of the placenta during pregnancy and explain ONE possible damaging side-effect of the re-ingestion of the placenta in the practice of placenta encapsulation. (2)
**(6)**

2.4 The diagram below represents a negative feedback mechanism where **A** and **B** represent hormones secreted by the respective glands.



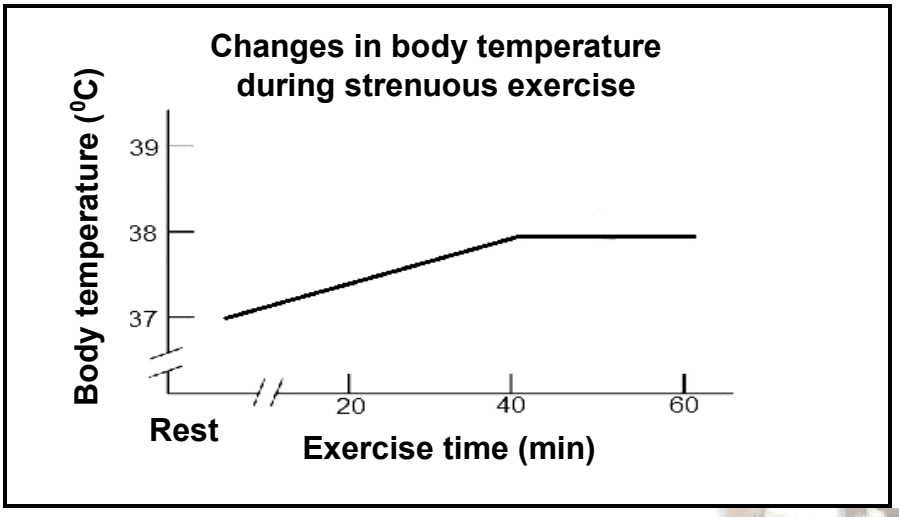

2.4.1 Identify hormone **A**. (1)

2.4.2 What is the role of any negative feedback mechanism in the human body? (1)

2.4.3 Describe the negative feedback mechanism that occurs when the level of hormone **B** is higher than normal in the blood. (5)

2.4.4 Explain the consequences for a person if hormone **B** remained abnormally low for extended periods of time. (4)
**(11)**

2.5 The graph below shows the results of an investigation regarding the changes in body temperature during strenuous exercise.




Adapted from: https://slidetodoc.com/scott-k-powers-edward-t-howley-theory-and-2/



2.5.1 Draw a table to represent the data in the graph above. (5)

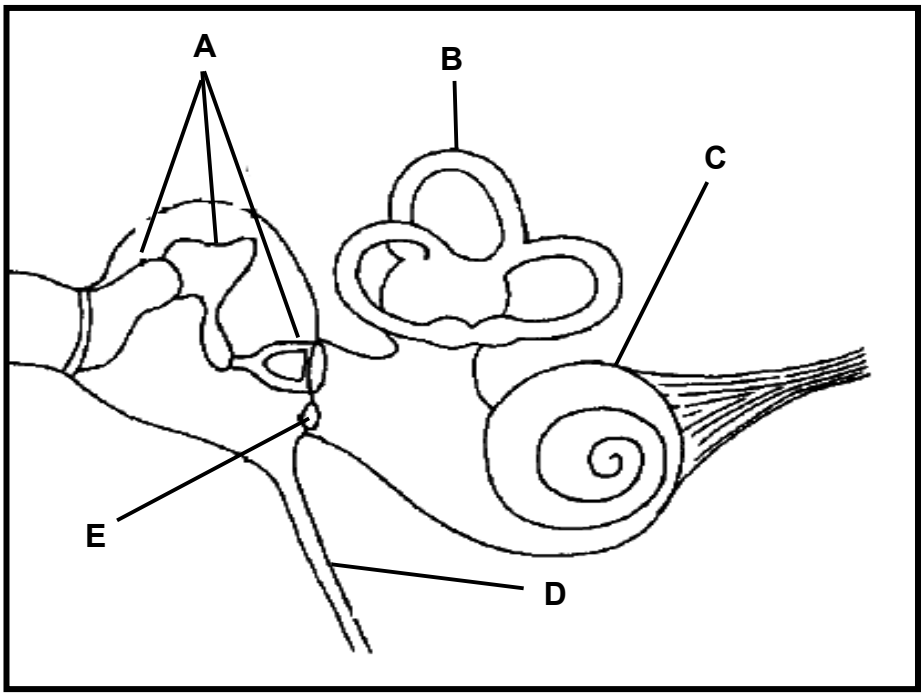
2.5.2 If body temperature is not effectively regulated during exercise a person can develop heat stroke which can be deadly if not treated. The first aid treatment is to cover the person with damp towels/sheets and then placed in front of a fan or other wind source.

Explain how this treatment is similar to the body's own strategy for lowering body temperature. (3)
**(8)**

**TOTAL QUESTION 2 [50]**

## QUESTION 3

3.1 The diagram below represents part of the human ear.




3.1.1 Identify parts:

a) **B** (1)

b) **C** (1)

3.1.2 Give the LETTERS only of the part where the following receptors are found:

a) Organ of Corti (1)

b) Ampulla (1)

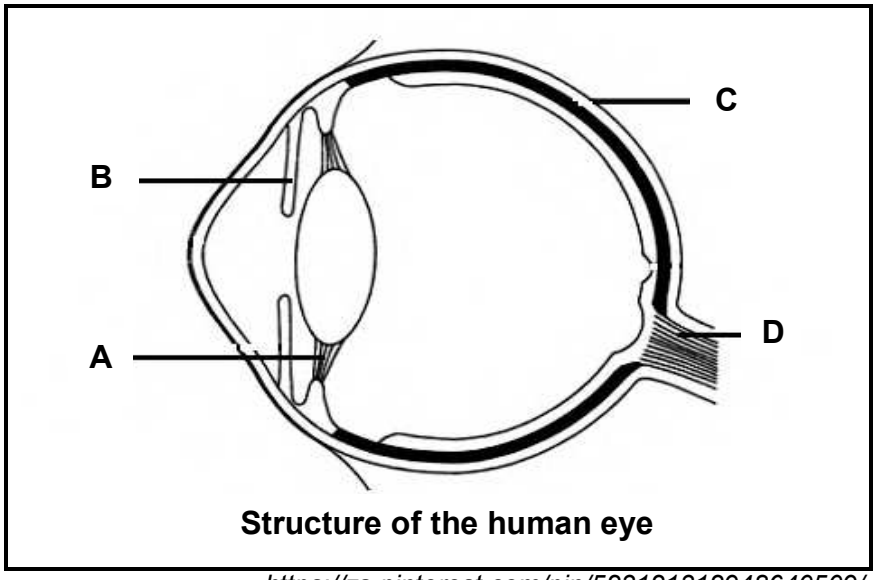
3.1.3 Explain, using LETTERS **D** and **E**, why a sensation in the throat is experienced when one stands very close to a loud speaker playing music. (3)

3.1.4 Young children love to spin around with outstretched arms.
Explain how they manage to maintain balance while spinning. (4)

3.1.5 The children mentioned in QUESTION 3.1.4 suddenly stop spinning and they still continue to feel as though they are moving.

Explain why this happens. (2)
**(13)**

3.2 The diagram below shows a side view of the human eye.




**Structure of the human eye**

*https://za.pinterest.com/pin/523121312948640509/*

3.2.1 Provide labels for parts numbered:

(a) **A** (1)

(b) **B** (1)

3.2.2 State ONE function of part **C**. (1)

3.2.3 Explain the consequence if part **D** is damaged during an accident. (3)

3.2.4 Explain TWO ways in which the lens is structurally suited to perform its function. (4)
**(10)**

3.3 Read the extract below.

> Playing a musical instrument has been shown to increase intelligence through improved communication between the left and right hemispheres of the brain. This results in positive effects on learning, memory, fine motor skills, verbal and non-verbal reasoning which leads to better brain functioning.
>
> *Anne R. Stoklosa, 2016 Instruments of Knowledge: Music and the Brain. The Review A Journal of Undergraduate Student Research*

3.3.1 Name the:

a) Structural unit of the nervous system (1)

b) Path taken by an impulse from a receptor to an effector (1)

c) Structure that is responsible for the communication between the left and right hemispheres (1)


3.3.2 Name ONE indicator from the extract above that implies increased intelligence. (1)

3.3.3 According to the information in the extract, which region of the brain is mainly developed by playing a musical instrument? (1)

3.3.4 Playing a musical instrument requires the use of multiple neural pathways.

Explain the significance of a synapse between two consecutive neurons. (2)
**(7)**

3.4 The peripheral nervous system consists of various types of nerves.

3.4.1 Draw a labelled diagram of a sensory neuron indicating the correct direction of the transmission of nerve impulses. (5)

3.4.2 Give the function of the neuron drawn in QUESTION 3.4.1 (1)
**(6)**

3.5 John has to deliver a speech and he is feeling extremely nervous.
This may be due to an automatic reaction to a stressful or frightening event brought about by a branch of the nervous system.

3.5.1 Name the section of the nervous system responsible for this feeling. (1)

3.5.2 Provide FOUR symptoms that he may experience as a result of the system mentioned in QUESTION 3.5.1 (4)

3.5.3 Name the HORMONE and GLAND that work with the peripheral system during stressful situations. (2)

3.5.4 Suggest a strategy he can use to physically calm himself and reduce the symptoms mentioned in QUESTION 3.5.2 (1)
**(8)**

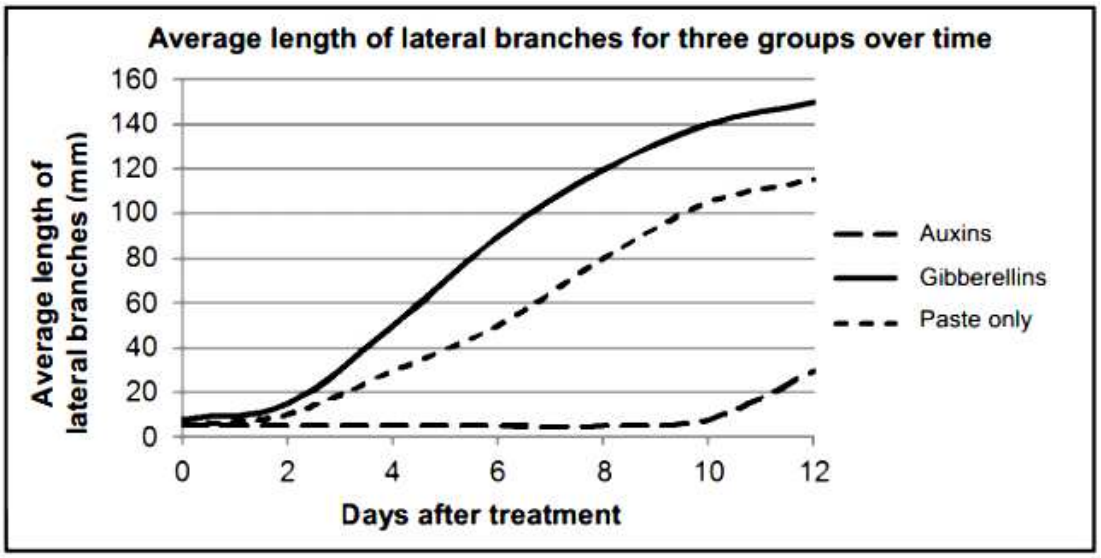
3.6 A learner investigated the effects of two plant growth substances, gibberellins and auxins, on apical dominance.

The apical buds of nine pea plants were removed. These plants were then divided equally into three groups. In each group the cut surface of the growing stems of the pea plants were treated in one of the following ways:

Group 1: Coated with a paste containing gibberellins
Group 2: Coated with a paste containing auxins
Group 3: Coated with a paste only (containing no plant growth hormones)

The length of the lateral branches of each plant was measured for a period of 12 days and the average for each group was calculated.

The results of the investigation are shown in the graph below.




3.6.1 Calculate the difference in the average length of the lateral branches between the plants treated with gibberellins and the plants treated with the paste only on the 8th day after the treatment.

Show ALL calculations. (3)

3.6.2 State TWO ways in which the reliability of the investigation could be increased. (2)

3.6.3 State the significance of more and longer lateral branches for the farming industry. (1)

**(6)**

**TOTAL QUESTION 3 [50]**

**TOTAL SECTION B: 100**
**GRAND TOTAL: 150**

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# PREPARATORY EXAMINATION

## GRADE 12


## MARKING GUIDELINES

**MARKS: 150**

**These marking guidelines consist**

**of 12 pages.**

## PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks is reached and put a wavy line and 'max' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Marks for the first three irrespective of whether all or some are correct/incorrect.

3. **If whole process is given when only a part of it is required**
   Read all and credit the relevant part.

4. **If comparisons are asked for but descriptions are given**
   Accept if the differences/similarities are clear.

5. **If tabulation is required but paragraphs are given**
   Candidates will lose marks for not tabulating.

6. **If diagrams are given with annotations when descriptions are required**
   Candidates will lose marks.

7. **If flow charts are given instead of descriptions**
   Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of the answer if correct.

10. **Wrong numbering**
    If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**
    Do not accept.

12. **Spelling errors**
    If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names are given in terminology**
    Accept if it appears on marking guidelines.

14. **If only the letter is asked for but only the name is given (and vice versa)**
Do not credit.

15. **If units are not given in measurements**
Marking guidelines will allocate marks for units separately, except where it is given in the question.

16. **Be sensitive to the sense of an answer, which may be stated in a different way.**

17. **Caption**
All illustrations (diagrams, sketches, graphs, tables, etc.) must have a cation.

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

19. **Changes to the memorandum**
No changes must be made to the marking guideline without consulting the cluster leader who in turn will consult with the curriculum implementer.

## SECTION A

## QUESTION 1

| | | | | |
|---|---|---|---|---|
| 1.1 | 1.1.1 | B✓✓ | | |
| | 1.1.2 | D✓✓ | | |
| | 1.1.3 | C✓✓ | | |
| | 1.1.4 | B✓✓ | | |
| | 1.1.5 | C✓✓ | | |
| | 1.1.6 | D✓✓ | | |
| | 1.1.7 | D✓✓ | | |
| | 1.1.8 | A✓✓ | | |
| | 1.1.9 | D✓✓ | | |
| | 1.1.10 | B✓✓ | 10 x 2 | **(20)** |

| | | | | |
|---|---|---|---|---|
| 1.2 | 1.2.1 | Insulin✓ | | |
| | 1.2.2 | Adrenal✓gland | | |
| | 1.2.3 | Osmoregulation✓ | | |
| | 1.2.4 | Aqueous humour✓ | | |
| | 1.2.5 | Abscisic acid✓ | | |
| | 1.2.6 | Endocrine✓system | | |
| | 1.2.7 | Hypothalamus✓ | | |
| | 1.2.8 | Hormones✓ | | |
| | 1.2.9 | Aldosterone✓ | | |
| | 1.2.10 | Pinna✓ | (10 x 1) | **(10)** |



| | | | | |
|---|---|---|---|---|
| 1.3 | 1.3.1 | B only✓✓ | | |
| | 1.3.2 | None✓✓ | | |
| | 1.3.3 | A only✓✓ | | |
| | 1.3.4 | B only✓✓ | (4 x 2) | **(8)** |

| | | | | |
|---|---|---|---|---|
| 1.4 | 1.4.1 | (a) External✓ fertilisation | | (1) |
| | | (b) Internal✓ fertilisation | | (1) |
| | 1.4.2 | Ovipary✓ | | (1) |
| | 1.4.3 | Amniotic✓ egg | | (1) |
| | 1.4.4 | - Allantois✓<br>- Chorion✓ | | (2)<br>**(6)** |

| | | | | |
|---|---|---|---|---|
| 1.5 | 1.5.1 | (a) | Seminal vesicle✓ | (1) |
| | | (b) | Cowper's gland✓ | (1) |
| | | (c) | Urethra✓ | (1) |
| | 1.5.2 | (a) | B✓ | (1) |
| | | (b) | D✓/C | (1) |
| | | (c) | A✓ | (1) |
| | | | | **(6)** |

**TOTAL SECTION A: 50**

## SECTION B

## QUESTION 2

2.1 2.1.1 (a) Meiosis✓ (1)

(b) Mitosis✓ (1)

2.1.2 23✓pairs/ twenty three pairs (1)

2.1.3 Oestrogen✓ (1)

2.1.4 **Spermatogenesis**✓*
-Under the influence of testosterone✓
-diploid cells in the seminiferous tubules of the testes✓
-undergo meiosis✓
-to form haploid sperm cells✓
***1 compulsory mark** + 3 (4)

2.1.5 (a) Morula✓ (1)

(b) Blastula✓/ blastocyst (1)

(c) Embryo✓ (1)

(d) Foetus✓ (1)
**(12)**

2.2 2.2.1 (a) Graafian follicle✓ (1)

(b) Ovulation✓ (1)

2.2.2 -It will lead to a drop in progesterone✓
-Which will lead to the endometrium breaking down✓ / menstruation to start
- the female will have a miscarriage✓/ loose the pregnancy (3)

2.2.3 -The hypophysis✓/pituitary gland
- secretes FSH✓
- which stimulates the development of a primary follicle✓
- in one of the ovaries✓
- Only one follicle develops to full maturity in every cycle✓
- into a mature Graafian follicle✓/structure **X** Any (4)

2.2.4
- Around day 14✓
- the Graafian follicle/ structure **X** is fully developed✓
- The mature Graafian follicle/structure **X** moves to the surface of the ovary✓
- forming a slight swelling✓
-There is a sharp increase in the concentration of LH✓
-The wall of the ovary ruptures✓
-The ovum✓/haploid secondary oocyte is released
- which is known as ovulation✓
- After ovulation the remains of the Graafian follicle✓/structure **X**
- developing into a mass of hollow cells the corpus luteum✓/structure **Z**

Any (4)
**(13)**

2.3 2.3.1
- Speeds up recovery✓
- Enhance milk production✓

Any (1)

2.3.2
- Serves as attachment for child to mother✓
- Secretes progesterone ✓
- Allows the diffusion of nutrients from the mother to the foetus✓
- Allows the diffusion of nitrogenous waste from the foetus to the mother✓
- Allows for gaseous exchange between the mother and the foetus✓
- Filters harmful substances e.g: drugs, medication, certain bacteria/pathogens✓
- Allow antibodies to protect foetus✓

**(Mark first THREE only)** Any (3)

2.3.3



Drugs/medication and other substances harmful to the foetus/baby may be retained in the placenta✓
This can now reach baby through breastmilk✓/ damage baby through breastmilk/ build up in mothers body

**OR**

Bacteria/viruses/fungi/pathogens captured in placenta✓
Can cause disease/infection in both mother and baby✓

**OR**

Excess nitrogenous waste still in placenta✓
May cause chemical imbalance/build-up of waste in mother or baby✓

**OR**

High levels of progesterone in placenta✓
Could lead to less milk production/ hormone imbalances✓ Any (2)
**(6)**

2.4 2.4.1 Thyroid stimulating hormone (TSH)✓ (1)

2.4.2 To establish homeostasis in an organism✓/ to maintain a constant internal environment (1)

2.4.3
- High levels of thyroxin are detected✓
- by the pituitary gland✓
- which leads to a decrease✓ in the secretion of TSH.
- Thyroid activity is slowed down✓ / less thyroxin is produced.
- Thyroxin levels drop back to normal✓ (5)

2.4.4
- If thyroxin levels remain low
- the basal metabolic rate (BMR) will be low✓
- and the person's body temperature will drop very low/ always feel cold✓
- chronic fatigue✓
- person may gain weight✓
- stunted physical growth✓
- slowed mental development✓
- slowed sexual development✓
- development of thick skin and tongue✓ Any (4)

**(10)**

2.5 2.5.1 **Changes in body temperature during strenuous exercise**

| Exercise time (min) | Body temperature (°C) |
|---|---|
| Rest/0 | 37 |
| 20 | 37,5 |
| 40 | 38 |
| 60 | 38 |

**Criteria to mark table**

| Description | Mark allocation |
|---|---|
| Heading (H) | 1 |
| Drawing of table (T) | 1 |
| Column headings (C) (independent and dependent variables with units) | 1 |
| Data (D) | 1-3 corresponding data correct = 1<br>All corresponding data correct = 2 |

(5)

2.5.2 The body cools down naturally by excreting sweat✓
Which evaporates✓
The moist towels/sheets mimics the sweat✓ and
the wind source aids evaporation✓ Any (3)

**(8)**

**TOTAL QUESTON 2 [50]**

## QUESTION 3

3.1 3.1.1 (a) Semi-circular canals✓ (1)

(b) Cochlea✓ (1)

3.1.2 (a) C✓ (1)

(b) B✓ (1)

3.1.3 - Loud sound✓/music cause a lot of vibrations in the ossicles/ pressure waves in the cochlea✓
- Excess vibrations are let out the round window **(E)** and the Eustachian tube **(D)**✓
- The Eustachian tube links to the throat, causing you the feel these excess vibrations in the throat✓ Any (3)

3.1.4 - Change in speed and direction of head causes endolymph in **semi-circular canals** to move✓
- Movement stimulates receptors: **cristae in ampulla**✓
- Cristae converts stimuli to nerve impulses✓
- Impulses transmitted by the vestibular and auditory nerve to cerebellum✓
- **Cerebellum** sends nerve impulses to muscles to restore the balance✓ (4)

Any

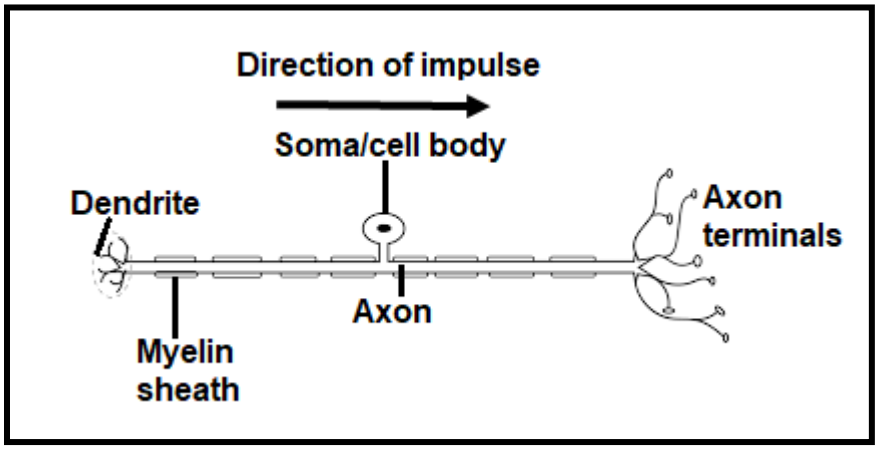
3.1.5 - Endolymph in the semi-circular canals keeps on moving✓
- Receptors send message to the cerebellum that movement is still occurring✓
- The brain interprets it as the child is still spinning✓/ spinning motion even though standing still

Any (2)

**(13)**

| | | | | | |
|---|---|---|---|---|---|
| 3.2 | 3.2.1 | (a) | A – Suspensory ligament✓ | | (1) |
| | | (b) | B – Iris✓ | | (1) |
| | 3.2.2 | | Protects the inner parts of the eye✓ | | (1) |
| | 3.2.3 | | - No impulse will be transmitted✓<br>- to the cerebrum✓<br>- resulting in loss of vision✓ | | (3) |
| | 3.2.4 | | - Lens is elastic✓<br>Therefore can change shape✓/convexity/allow for accommodation<br>- Lens is transparent✓<br>to allow light rays to pass through✓<br>- Lens is biconvex✓<br>to refract light rays✓ | (Any 2×2) | (4)<br>**(10)** |
| 3.3 | 3.3.1 | (a) | Neuron✓ | | (1) |
| | | (b) | Reflex arc✓ | | (1) |
| | | (c) | Corpus callosum✓ | | (1) |
| | 3.3.2 | | Positive effects on:<br>- learning✓<br>- memory✓<br>- fine motor skills✓<br>- verbal reasoning✓<br>- non-verbal reasoning✓ | Any | (1) |
| | 3.3.3 | | Cerebrum✓ | | (1) |
| | 3.3.4 | | - Ensures transmission of impulse in only ONE direction✓<br>- Impulses can be transmitted to more than one neuron simultaneously✓<br>- Filters unimportant✓/constant/weak impulses | Any | (2)<br>**(7)** |

3.4 3.4.1 **Sensory neuron**




| Description | Mark allocation |
|---|---|
| Heading (H) | 1 |
| Correct diagram drawn (D) | 1 |
| Any TWO correct labels | 2 |
| Direction of impulse indicated correctly (A) | 1 |

(5)

3.4.2 Conducts impulses from a receptor to the central nervous system✓/CNS (1)
**(6)**

3.5 3.5.1 Sympathetic✓ nervous system (1)

3.5.2
- Increased heart beat✓
- Increased breathing rate✓
- Dilated pupils✓
- Pale complexion✓
- Shivering✓
- Dry mouth✓
- Sweating✓
- Feeling of constantly needing to urinate✓

**(Mark first FOUR only)** Any (4)

3.5.3
- Adrenalin✓
- Adrenal gland✓ (2)

3.5.4
- Taking deep slow breaths✓
- Purposefully contracting muscles and relaxing them✓

Any (1)
**(8)**

| | | | |
|---|---|---|---|
| 3.6 | 3.6.1 | (120✓ – 80)✓mm = 40✓ mm | (3) |
| | 3.6.2 | - Increase the number of plants used in each treatment✓/ group<br>- Repeat the investigation✓<br>**(Mark first TWO only)** | (2) |
| | 3.6.3 | - Fruit / flowers grow on lateral branches✓<br>- Increased fruit / flower production✓ Any | (1) |
| | | | **(6)** |
| | | **TOTAL QUESTION 3** | **[50]** |
| | | **TOTAL SECTION B:** | **100** |
| | | **GRAND TOTAL:** | **150** |